

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 16, 2004

REMARKS

Claims 6-10 and 13-16 are pending in this application. For purposes of expedition, claims 1-3 have been canceled without prejudice or disclaimer. Likewise, claims 4-5 and 11-12 have also been canceled without prejudice. However, dependent claims 6 and 13 have been amended to incorporate all limitations of their respective base claims 4 and 11 (now canceled) and intervening claims 5 and 12 (now canceled) in an effort to expedite compact prosecution of the instant application and to place all claims 6-10 and 13-16 in condition for allowance. Claims 7-10 and 14-16 have been amended to ensure proper antecedent basis with base claims 6 and 13 and avoid §112 issues.

As a preliminary matter, the Examiner notes that the current status of prior application Serial No. 10/326,978 needs to be updated. In response thereto, the specification has been amended to update the status of prior application Serial No. 10/326,978, as now issued as U.S. Patent No. 6,721,841.

The abstract of the disclosure has been objected to the term "I/O subsystem A for open system" and the term "I/O subsystem B for a main frame" are not consistently used. In response thereto, the abstract has been amended in those instances to overcome the objection.

Claims 1-3 have been objected to because of several informalities kindly indicated on pages 2-3 of the Office Action (Paper No. 20040604). As previously discussed, for purposes of expedition, claims 1-3 have been canceled without prejudice or disclaimer to render the objection moot.

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

Similarly, claims 4-10 and 11-16 have been objected to because of several informalities kindly indicated on page 3 of the Office Action (Paper No. 20040604). Again, claims 4 and 11, which allegedly contain ambiguities, have been canceled without prejudice or disclaimer to render the objection moot. Claims 6 and 13 have been rewritten to differentiate a write request issued from a host computer versa a write request issued from a first disk controller to avoid the problem raised by the Examiner.

Claims 4-10 have been rejected under 35 U.S.C. §112, 1st ¶, as failing to comply with the enablement requirement. Specifically, the Examiner asserts that the "controller" cannot send the write request to the "second disk Identification Information." The Examiner's assertion is well taken. As a result, base claims 6 and 13 have been rewritten to avoid the problem raised by the Examiner.

Claims 8-10 and 15-16 have been rejected under 35 U.S.C. §112, 1st ¶, as failing to comply with the written description requirement. Specifically, the Examiner asserts that there is no support in the specification for the "first disk controller and the second disk controller to both have an interface for coupling to the host computer" as defined in claim 8. Actually, there is support in the specification for such a feature. For example, as shown, in FIG. 1, disk controller B 113 is coupled to a host 111 directly, via a SCSI Interface 112. Disk controller A 104 is coupled to the host 111 indirectly, via SCSI interface 108, disk controller B 113 and SCSI interface 112, since the disk controller A 104 is in communication with the host 111. Nowhere in Applicants' claim 8 is there a requirement that the interface must be directly coupled to the host computer. Direct coupling may suffice. In view of this

Appl. No. 10/683,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

explanation, Applicants respectfully request that the rejection of Applicants' claim 8 be withdrawn.

Separately, the Examiner also asserts that there is also no support in the specification for the "interface for coupling the controller to the second disk controller to be the same type of interface for coupling the second disk controller to the host computer" as defined in claim 15. Actually, claim 15 expressly defines that the "controller is coupled to [said] second disk controller via an interface, which is the same type of interface as an interface via which said second disk controller coupled to [said] host computer." As previously discussed, as shown, in FIG. 1, for example, controller A 104 is coupled to another (2nd) controller B 113, via a SCSI interface 108, which is the same type of interface 112 via which the 2nd controller B 113 coupled to the host computer 111. In view of this explanation, Applicants respectfully request that the rejection of Applicants' claim 15 be withdrawn.

Claims 1-3, 4-9 and 11-15 have been rejected under 35 U.S.C. §102(b) as being anticipated by Beal et al., U.S. Patent No. 5,155,845 for reasons stated on pages 5-8 of the Office Action (Paper No. 20040604). While Applicants disagree with the Examiner's assessment of Beal '845, claims 1-3 have been canceled without prejudice or disclaimer for purposes of expedition. Likewise, claims 4-5 and 11-12 have been canceled without prejudice or disclaimer in favor of early allowance of claims 6-10 and 13-16. As previously discussed, claims 6 and 13 have been rewritten to incorporate all limitations of respective base claims 4 and 11 and intervening claims 5 and 12, and make express reference to the "correlation information" used to control data storage, in order to place in condition for allowance.

For example, claim 6, as amended, now a system for storing data comprising:

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

a first storage system comprising a first disk controller and at least one first disk coupled to said first disk controller;
a second storage system comprising a second disk controller and at least one second disk coupled to said second disk controller;
and
a controller coupled to said first storage system, said second storage system, a host computer, and a service processor,
wherein said controller comprises a memory in which correlation information among first disk identification information, identification information designating a storage system, and second disk identification information is stored, and said correlation information is set in said controller by said service processor coupled to said controller, and
wherein said controller is configured to receive a write request from said host computer, select a storage system including a target disk designated by first disk identification information included in the write request by using said correlation information, obtain identification information designating a selected storage system and second disk identification information designating the target disk based on said first disk identification information included in the write request and said correlation information, and send a write request to the selected storage system according to said identification information designating the selected storage system and said second disk identification information.

Similarly, base claim 13, as amended, defines a controller coupled to a first storage system, a second storage system, a host computer and a service processor, in which said first storage system comprises a first disk controller and at least one first disk, and said second storage system comprises a second disk controller and at least one second disk, comprising:

a transfer device configured to transfer write data received from said host computer to one of said first storage system and said second storage system;
a memory to store correlation information among first disk identification information, identification information designating a storage system, and second disk identification information, said correlation information being set from said service processor,
wherein said controller is configured to receive a write request issued from said host computer, select a storage system including a target disk designated by first disk identification information included in the write request by using said correlation information, obtain identification information designating a selected storage system and

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

second disk identification information designating the target disk based on said first disk identification information included in the write request and said correlation information, and send a write request to the selected storage system according to said identification information designating the selected storage system and said second disk identification information.

As expressly defined in Applicants' base claim 6, a system for storing data comprises two storage systems, i.e., 1st storage system, 2nd storage system, a controller (for example, controller 104, as shown in FIG. 2) coupled to the two storage systems along with a host computer (for example, host 101) and a processor (for example, service processor 109). Alternatively, as defined in Applicants' base claim 13, the controller is coupled to the two storage systems along with a host computer and a service processor, in which a memory is used to store correlation information [among first disk identification information, identification information designating a storage system, and second disk identification information] set from said service processor. The controller contains "correlation information" stored therein (as shown, for example, in FIG. 4 and FIG. 5, in which the controller 104 has local controller-connected disk data 314 and remote controller-connected disk data 315, which are collectively referred to as "correlation information").

Upon receipt of a write request from the host computer, the controller selects a storage system having the target disk by using first disk identification information and correlation information stored therein. The controller then obtains identification information for identifying a selected storage system and second disk identification information based on the first disk identification information and correlation information contained in the write request and sends the write request to the

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

selected storage system according to the identification information and second disk identification information.

As defined in Applicants' base claims 6 and 13, the correlation information used for selecting a storage system having the target disk is set in the controller from the service processor. The service processor is another device, different from the host computer which issues write request. As a result, the host computer needs **not** know in advance as to which one of the storage systems has the target disk intended by the write request which the host computer issues. This is because the storage system in which the target disk is actually present is determined by the correlation information set in the controller by the service processor. Therefore, the controller can advantageously deliver a write request to any of the storage systems transparently with respect to the host computer (i.e., without making the host computer aware which one of the storage systems the target disk intended by the write request is present).

In contrast to Applicants' base claims 6 and 13, Beal '854 discloses a known technique for transmitting and receiving data between I/O subsystems, in which data back-up and other functions are independently operated and managed, as expressly acknowledged in the BACKGROUND section of Applicants' disclosed invention. Specifically, Beal '854 describes a host 101, as shown in FIG. 1 or FIG. 2, connected to a data storage controller (DSC) 105 which is interconnected to other DSC 107, or alternatively, multiple hosts 101, 121, as shown in FIG. 3 or FIG. 4, connected to multiple DSCs 105, 107, equipped for the provision of extended multiple copy service. Extended Multiple Copy service is a service in which the number of copies to be provided is limited only by the number of storage subsystems utilized. For

Appl. No. 10/863,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

example, as shown in FIG. 12, when a host 101 issues a write command to DSC 105, associated write data is stored not only in disk drive 109 belonging to DSC 105, but also in disk drive 111 belonging to DSC 107 and in disk drives 121 belonging to DSC 127.

In order to provide such an Extended Multiple Copy Service, it is first necessary for the host 101 to issue a command sequence, as shown in FIG. 14, to DSC 105 to instruct preparatory actions for such service (see Col. 28, lines 16-23 of Beal '845). This command sequence includes Request packet, as shown in FIG. 17, and field 2 of the Request packet specifies local volume present in devices 109 belonging to DSC105 and field 3 of the Request packet specifies a plurality of remote volumes present in devices 111 belonging to DSC107 and in devices 121 belonging to DSC127 (col. 28, lines 53-57). For example, if in the command sequence, the host 101 specifies, as a local volume, volume #3 in devices 109 and, as remote volumes, volume #1 in devices 111 and volume #2 in devices 121. Then, upon receipt of such a command sequence, DSC 105 takes preparatory actions for the Extended Multiple Copy service so that copy of the write data is held among volume #3 in devices 109, volume #1 in devices 111 and volume #2 in the devices 121. As a result, whenever host 101 issues to DSC 105 a write command addressed to volume #3, DSC 105 transmits write data to DSC 107 and to DSC 127 so that associated data is written not only in volume #3 present in drives 109 belonging to DSC105 itself, but also in volume #1 and volume #2 belonging to DSC 107 and DSC 127 (see, col. 28, lines 23-50 of Beal '845).

In other words, the host, according to Beal '845, which desires to use the Extended Multiple Copy services, is required first to issue a command sequence,

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

designate a local volume and a remote volume therein and set the DSC accordingly. As a result, when issuing a write command, the host as disclosed by Beal '845 already knows (recognizes) that by specifying which local volume in the write command, associated write data will be stored in which remote volume.

Beal '845 does **not** disclose the manner in which "correlation information" is used to determine a storing destination of write data, and that such "correlation information" used for determining a storing destination of write data is "set in the controller by another [service] processor, and is not set by the host computer which issues the write request, as expressly defined in Applicants' base claims 6 and 13. Since the "correlation information" used for determining a storing destination of write data is set in the controller by another [service] processor, and **not** by the host computer, the host computer needs **not** recognize which storage system write data is going to be stored in accordance with the write request issued. As a result, the controller can advantageously deliver a write request to any of the storage systems transparently with respect to the host computer (namely, without making the host computer aware as to which one of the storage systems the target disk intended by the write request is present).

More importantly, there is no disclosure anywhere in Beal '845 of Applicants' claimed "controller" being "configured to receive a write request from [said] host computer, select a storage system including a target disk designated by first disk identification information included in the write request by using said correlation information, obtain identification information designating a selected storage system and second disk identification information designating the target disk based on said first disk identification information included in the write request and said correlation

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

information, and send a write request to the selected storage system according to said identification information designating the selected storage system and said second disk identification information" as expressly defined in Applicants' base claims 6 and 13.

The rule under 35 U.S.C. §102 is well settled that anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. In re Paulsen, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); In re Spada, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Those elements must either be inherent or disclosed expressly and must be arranged as in the claim. Richardson v. Suzuki Motor Co., 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); Verdegall Bros., Inc. v. Union Oil Co., 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). The corollary of that rule is that absence from the reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 230 USPQ2d 81 (Fed. Cir. 1986).

In the present situation, Beal '845 fails to disclose and suggest key features of Applicants' base claims 6 and 13. Therefore, Applicants respectfully request that the rejection of base claims 6 and 13 and their respective dependent claims 7-10 and 14-16 be withdrawn.

Separately, dependent claims 10 and 16 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Beal '845 for reasons stated on page 9 of the Office Action (Paper No. 20040604). As previously discussed, base claims 6 and 13 are now deemed patentably distinguishable over Beal '845. As a result, dependent

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 16, 2004

claims 10 and 16 should also be deemed patentably distinguishable over Beal '845 by virtue of dependency upon the now allowed claims 6 and 13.

Lastly, claims 4-9 and 11-15 have been rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of Applicants' earlier issued U.S. Patent No. 6,721,841 in view of Beal '845 for reasons stated on pages 10-11 of the Office Action (Paper No. 20040604). Similarly, claims 1-9 and 11-15 have been rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claims 4-5 of Applicants' earlier issued U.S. Patent No. 6,529,976 in view of Beal '845 for reasons stated on pages 11-12 of the Office Action (Paper No. 20040604). Claims 1-9 and 11-15 have also been rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claim 1 of Applicants' earlier issued U.S. Patent No. 6,098,129 in view of Beal '845 for reasons stated on pages 12-13 of the Office Action (Paper No. 20040604). Lastly, claims 4-16 have been provisionally rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claims 6-9 and 11-12 of Applicants' co-pending application Serial No. 10/663,656 in view of Beal '845 for reasons stated on pages 14-15 of the Office Action (Paper No. 20040604). As previously discussed, claims 1-5 and 11-12 have been canceled without prejudice or disclaimer. Claims 6-10 and 13-16, as amended, are believed to contain features that are patentably distinct from that of claims 1-4 of Applicants' earlier issued U.S. Patent No. 6,721,841, claims 4-5 of Applicants' earlier issued U.S. Patent No. 6,529,976, claim 1 of Applicants' earlier issued U.S. Patent No. 6,098,129, and claims 6-9 and 11-12 of Applicants' co-pending application Serial No. 10/663,656 in view of Beal '845. However, in the

Appl. No. 10/663,662
Amendment dated October 15, 2004
Reply to Office Action of June 15, 2004

interest of expedition, a terminal disclaimer is submitted herewith to place all claims in condition for allowance. As a result, the filing of such a terminal disclaimer is not, and should not be construed or interpreted as an admission that claims 6-10 and 13-16 as pending in the instant application are not patentably distinct from that of claims 1-4 of Applicants' earlier issued U.S. Patent No. 6,721,841, claims 4-5 of Applicants' earlier issued U.S. Patent No. 6,529,976, claim 1 of Applicants' earlier issued U.S. Patent No. 6,098,129, and claims 6-9 and 11-12 of Applicants' co-pending application Serial No. 10/663,656 in view of Beal '845. Applicants respectfully reserve all rights to file subsequent related application(s) (including reissue applications) directed to any or all previously claimed limitations/features which have been amended, canceled or disclaimed, or to any or all limitations/features not yet claimed, i.e., Applicants have no intention or desire to dedicate or surrender any limitations/features of the disclosed invention to the public.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

INTERVIEW:

In the interest of expediting prosecution of the present application, Applicants respectfully request that an Examiner interview be scheduled and conducted. In accordance with such interview request, Applicants respectfully request that the Examiner, after review of the present Amendment, contact the undersigned local

Appl. No. 10/663,862
Amendment dated October 16, 2004
Reply to Office Action of June 15, 2004

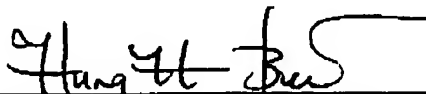
Washington, D.C. area attorney at the local Washington, D.C. telephone number (703) 312-6600 for scheduling an Examiner interview, or alternatively, refrain from issuing a further action in the above-identified application as the undersigned attorneys will be telephoning the Examiner shortly after the filing date of this Amendment in order to schedule an Examiner interview. Applicants thank the Examiner in advance for such considerations. In the event that this Amendment, in and of itself, is sufficient to place the application in condition for allowance, no Examiner interview may be necessary.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 500.36172VC3), and please credit any excess fees to said deposit account.

Respectfully submitted,

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